

FINE TUNING THE 91 CORRIDOR

Western Riverside County Programs and Projects
Committee Meeting
March 26, 2018

Michael Blomquist, Toll Program Director

David Thomas, Toll Project Manager

Sheldon Mar, Consultant Project Manager

Today's Presentation

- I-15 northbound-to-91 westbound entrance options
 - **Traffic impacts**
- 91 westbound at county line
 - **Traffic impacts** of turning the ramp-meter off under existing conditions
- 91 westbound at county line
 - **Implementation:** costs, schedule, and issues
- Results planned for the next WRCPP meeting



15 NORTHBOUND TO 91 WESTBOUND EXPRESS LANES ENTRANCE

TRAFFIC OPERATION ANALYSIS

- **15 Northbound**
- **Traffic Flow Options**

Option 2



lane drop

Magnolia Ave

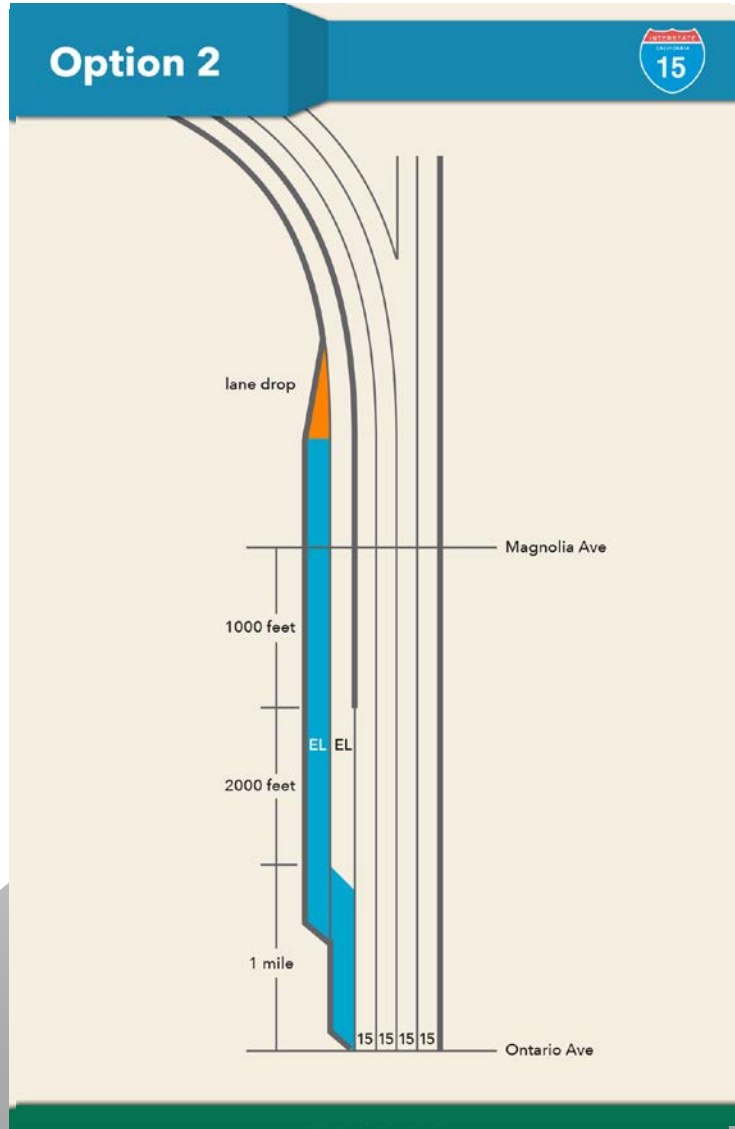
1000 feet

2000 feet

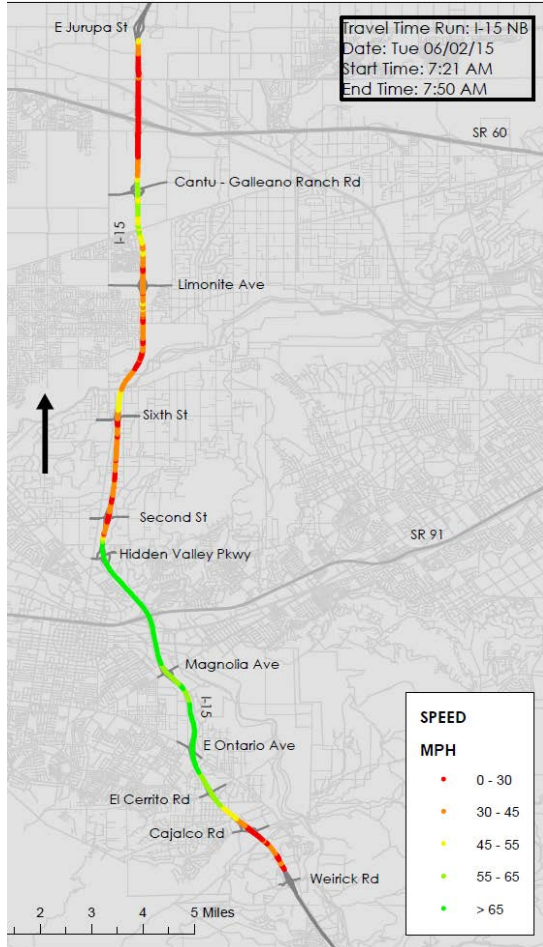
1 mile

15 15 15 15

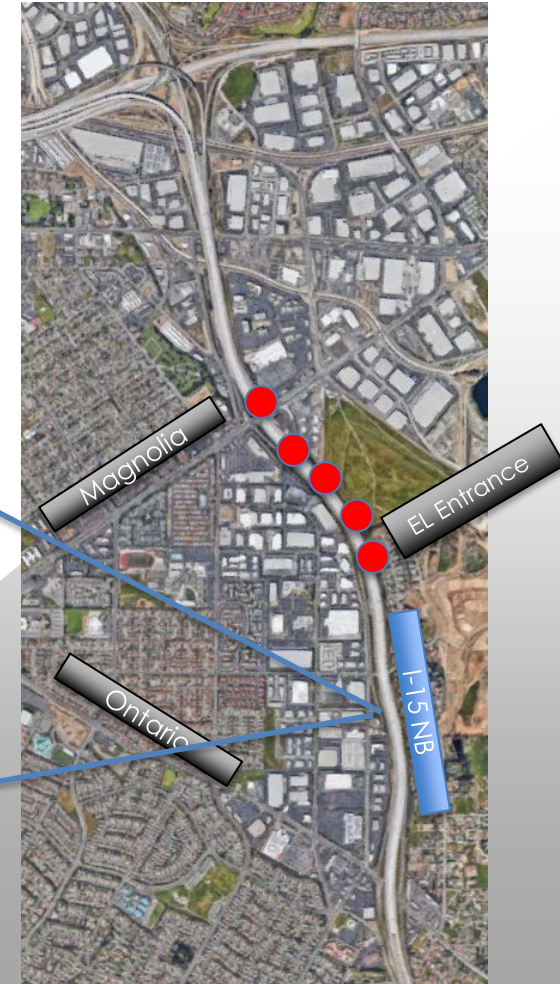
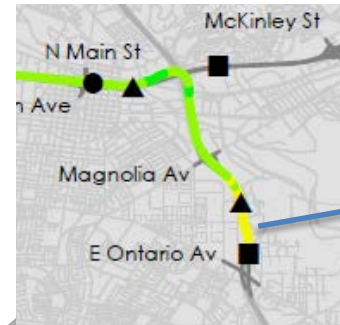
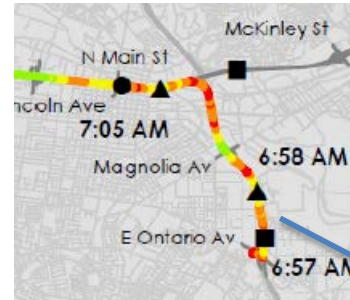
Ontario Ave



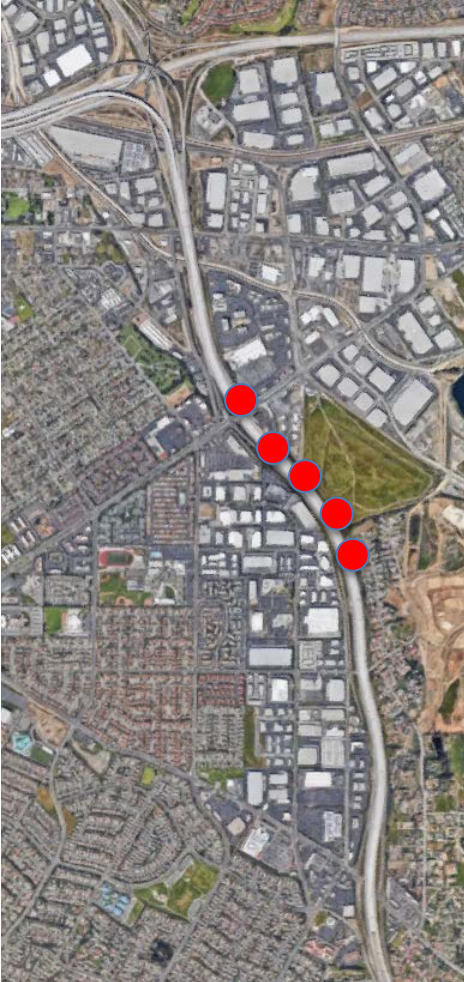
I-15 Northbound – Existing Traffic Conditions



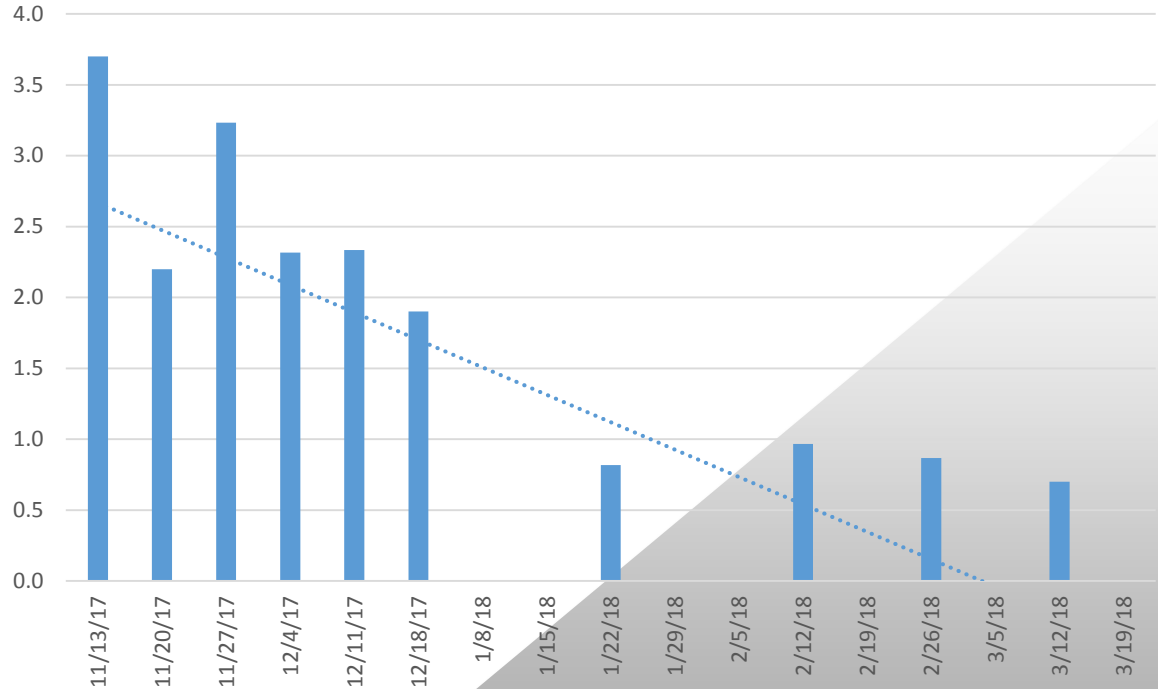
- Queues south of Cajalco are not new
- Congestion around Ontario Ave is new
- EL traffic extended into GP lanes
- Queues developed along GP lanes



I-15 Northbound – Existing Traffic Conditions



of Hours of Queue - EL Channelizers until clearing McKinley

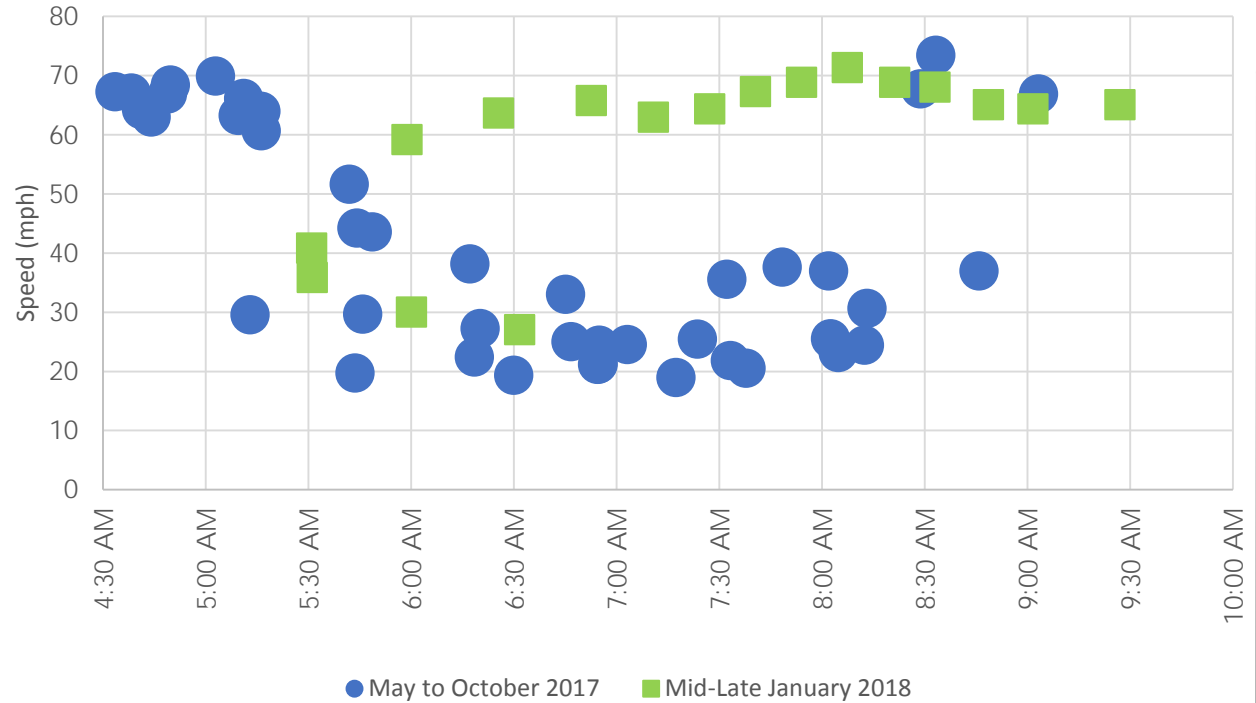


- Duration of queues from I-15 NB to WB EL has declined as tolls have increased.
- Some days see no queue at all.

I-15 Northbound – Existing Traffic Conditions



I-15 NB Express - Price Sign (Ontario) to Gantry (3.3 miles)



- NB to WB EL speeds in recent past have improved, near free-flow

I-15 Northbound – No-Build vs. Option 1

I-15 Existing Model

Location	Express - NB to WB									I-15 GP Lanes								
	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM
At Magnolia	65	63	23	13	13	13	13	13	32	66	66	66	64	64	64	64	63	64
N. of Egress	58	52	32	13	13	13	13	16	35	63	58	53	42	42	43	42	43	52
S. of Aux Lane	64	63	59	22	20	25	25	31	51	65	64	60	23	22	26	25	32	52
N. of Ontario	66	66	66	53	28	17	24	23	56	66	66	66	52	28	18	24	23	56
At Ontario	66	66	66	61	49	34	39	41	65	66	66	66	61	49	34	39	41	65
S. of Ontario	66	65	65	64	54	54	62	59	64	66	65	65	64	54	54	62	59	64
El Cerrito-Ontario	60	61	62	54	47	43	47	45	52	60	61	62	54	47	43	47	45	52

I-15 Option 1 - Extended Auxiliary Lane

Location	Express - NB to WB									I-15 GP Lanes								
	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM
At Magnolia	64	63	18	13	13	13	13	13	39	66	66	66	65	65	64	65	64	65
N. of Egress	64	62	40	14	14	13	13	14	43	66	66	65	58	54	52	50	53	64
S. of Aux Lane	66	64	47	18	14	14	13	15	51	66	65	52	29	25	25	22	26	56
N. of Ontario	66	65	65	65	64	64	64	64	66	66	66	65	65	65	64	64	64	65
At Ontario	67	67	67	67	67	66	66	66	67	67	67	67	67	67	66	66	66	67
S. of Ontario	66	65	65	64	65	62	63	63	65	66	65	65	64	65	62	63	63	65
El Cerrito-Ontario	58	62	62	53	58	42	48	46	59	58	62	62	53	58	42	48	46	59

- GP lane queues improve versus existing
- Extend EL auxiliary lane permits more storage and gets EL traffic out of the way
- Queue spills past channelizers – queuing in EL exists alongside fast-moving GP traffic

I-15 Northbound – No-Build vs. Option 2

I-15 Existing Model

Location	Express - NB to WB									I-15 GP Lanes								
	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM
At Magnolia	65	63	23	13	13	13	13	13	32	66	66	66	64	64	64	64	63	64
N. of Egress	58	52	32	13	13	13	13	16	35	63	58	53	42	42	43	42	43	52
S. of Aux Lane	64	63	59	22	20	25	25	31	51	65	64	60	23	22	26	25	32	52
N. of Ontario	66	66	66	53	28	17	24	23	56	66	66	66	52	28	18	24	23	56
At Ontario	66	66	66	61	49	34	39	41	65	66	66	66	61	49	34	39	41	65
S. of Ontario	66	65	65	64	54	54	62	59	64	66	65	65	64	54	54	62	59	64
El Cerrito-Ontario	60	61	62	54	47	43	47	45	52	60	61	62	54	47	43	47	45	52

I-15 Option 2 - Extended Auxiliary Lane and 2-lane entrance

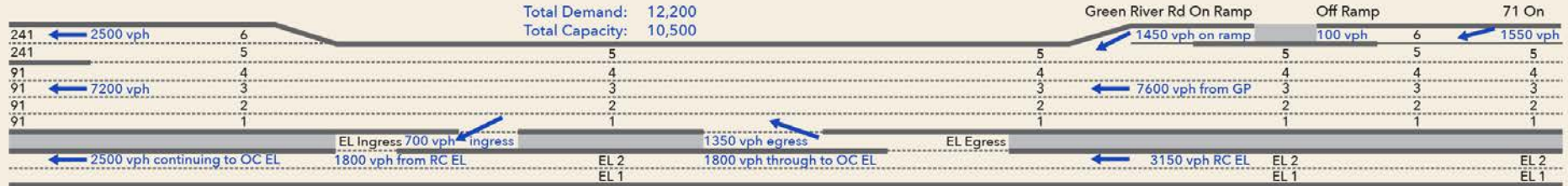
Location	Express - NB to WB									I-15 GP Lanes								
	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM
At Magnolia	64	63	16	7	5	5	5	5	37	66	66	66	65	65	65	65	65	65
N. of Egress	67	67	67	66	66	66	66	66	67	66	66	66	65	65	64	64	64	65
S. of Aux Lane	67	66	67	66	66	66	66	66	67	66	66	66	66	65	65	65	65	65
N. of Ontario	67	66	66	66	66	65	65	65	66	67	66	66	66	66	65	65	65	66
At Ontario	67	67	67	67	67	66	66	66	67	67	67	67	67	67	66	66	66	67
S. of Ontario	65	65	65	64	65	63	63	62	65	65	65	65	64	65	63	63	62	65
El Cerrito-Ontario	56	62	62	49	57	44	47	41	59	56	62	62	49	57	44	47	41	59

- Option 2 shortens the EL queue
- Forces a merge resulting in crawl conditions but for a shorter distance – does not spill outside of the EL

**91 WESTBOUND AT COUNTY LINE
TURNING OFF THE GREEN RIVER RAMP METER
TRAFFIC OPERATION ANALYSIS**

Current Traffic Counts

Existing



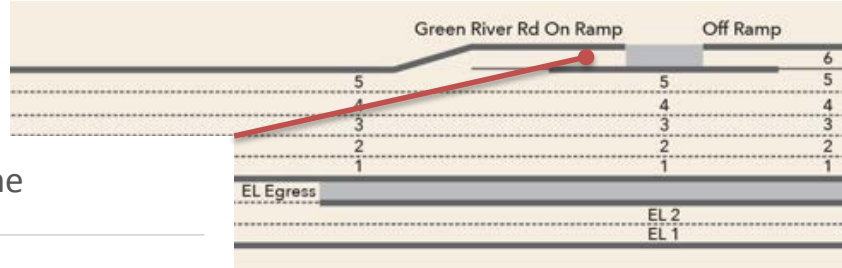


Green River Road Ramp

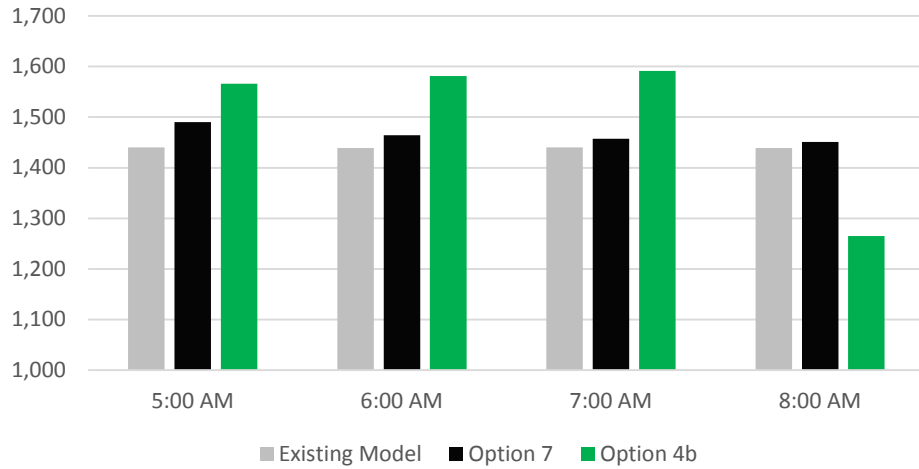




Green River Road Ramp Meter – Option 7 (existing)

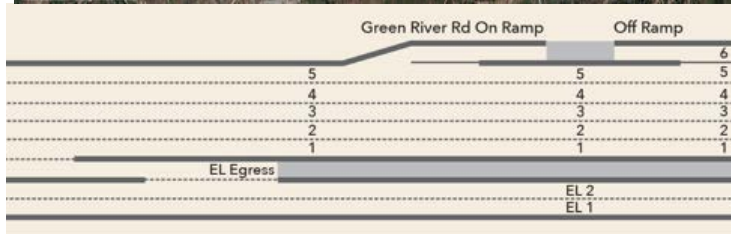


Green River Road On-Ramp Volume



- Green River Road throughput 100-150 vph higher under Option 4b
- Option 7 (existing without meter) shows at most 50 vph more throughput
- Constrained by the GP lane merge.

Green River Road Ramp Meter – Option 7 (existing)



Others:
29
minutes

Opt 7:
25
minutes

		GP Speed (mph)	
From	To	Existing Model	Existing w/ Meter (Option 7)
4:30 AM	4:45 AM	36	43
4:45 AM	5:00 AM	34	39
5:00 AM	5:15 AM	28	32
5:15 AM	5:30 AM	18	21
5:30 AM	5:45 AM	13	15
5:45 AM	6:00 AM	11	12
6:00 AM	6:15 AM	9	11
6:15 AM	6:30 AM	8	10
6:30 AM	6:45 AM	8	9
6:45 AM	7:00 AM	8	9
7:00 AM	7:15 AM	7	9
7:15 AM	7:30 AM	7	9
7:30 AM	7:45 AM	7	9
7:45 AM	8:00 AM	7	9
8:00 AM	8:15 AM	7	10
8:15 AM	8:30 AM	8	10
8:30 AM	8:45 AM	8	12
8:45 AM	9:00 AM	9	14
9:00 AM	9:15 AM	11	20
9:15 AM	9:30 AM	14	34
9:30 AM	9:45 AM	23	42
9:45 AM	10:00 AM	40	43

- Existing minus Green River Road meter – speed improves from 8 mph to 10 mph
- Exceeds 20 mph after 9:15 AM
- Less improvement vs. Option 4 without meter

"Heat Map" – Option 7

Existing, remove Green River Road Ramp Meter

EXISTING

GENERAL PURPOSE	From	To	Approaching				County Line		County Line	County Line	w/o EL	e/o EL	Grn Riv	GrnRiv-71	SR 71	71-Serfas	Serfas-Maple	Maple-Lincoln	Lincoln-Main
			w/o 241 Off	SR 241 Off	SR 241 Aux	241	e/o EL Ing	West	Mid	East	Egress	Egress	Merge						
GENERAL PURPOSE	4:30 AM	5:00 AM	58	57	60	60	56	60	61	53	34	32	17	24	16	30	61	61	51
	5:00 AM	5:30 AM	59	60	60	61	57	60	61	50	24	22	14	14	10	9	9	63	58
	5:30 AM	6:00 AM	61	61	59	61	57	61	61	51	18	16	12	13	9	8	11	64	63
	6:00 AM	6:30 AM	61	61	59	60	57	60	61	51	17	16	12	13	9	8	14	65	64
	6:30 AM	7:00 AM	62	62	58	61	59	61	61	53	16	14	10	11	8	8	50	66	64
	7:00 AM	7:30 AM	63	62	57	61	58	61	62	53	15	14	11	11	8	7	66	66	65
	7:30 AM	8:00 AM	64	61	55	61	58	61	62	53	15	15	11	12	9	7	66	66	65
	8:00 AM	8:30 AM	64	61	53	61	57	61	62	53	15	15	11	11	8	7	66	66	65
	8:30 AM	9:00 AM	64	59	50	60	57	61	61	53	15	15	11	11	8	7	65	65	64
9:00 AM	9:30 AM	63	59	47	60	57	60	61	53	15	15	11	11	9	14	65	65	64	
9:30 AM	10:00 AM	63	61	54	60	55	61	61	51	21	20	14	16	15	48	64	64	64	
EXPRESS LANE	4:30 AM	5:00 AM	60	60	61	60	61	61	61	59	59	59	59	59	59	59	58	61	56
	5:00 AM	5:30 AM	59	58	60	60	60	61	60	57	56	57	58	58	59	59	56	60	56
	5:30 AM	6:00 AM	60	60	61	60	61	62	60	57	56	58	58	58	58	59	56	60	56
	6:00 AM	6:30 AM	60	60	61	61	61	62	57	56	56	58	58	58	59	59	56	60	56
	6:30 AM	7:00 AM	60	61	61	61	62	62	37	55	54	58	58	58	59	59	56	60	56
	7:00 AM	7:30 AM	61	62	62	62	62	63	19	35	51	58	58	58	59	59	56	60	56
	7:30 AM	8:00 AM	61	62	62	62	63	63	15	17	19	39	57	58	58	59	56	60	56
	8:00 AM	8:30 AM	61	62	62	62	63	63	13	16	17	15	21	58	59	59	56	60	56
	8:30 AM	9:00 AM	61	61	62	61	62	62	15	17	18	16	17	58	59	59	57	60	56
9:00 AM	9:30 AM	60	61	61	61	62	62	23	30	35	41	52	59	59	60	58	61	56	
9:30 AM	10:00 AM	60	61	61	61	61	62	60	59	58	59	59	60	60	60	59	61	57	

OPTION 7

GENERAL PURPOSE	From	To	Approaching				County Line		County Line	County Line	w/o EL	e/o EL	Grn Riv	GrnRiv-71	SR 71	71-Serfas	Serfas-Maple	Maple-Lincoln	Lincoln-Main
			w/o 241 Off	SR 241 Off	SR 241 Aux	241	e/o EL Ing	West	Mid	East	Egress	Egress	Merge						
GENERAL PURPOSE	4:30 AM	5:00 AM	57	58	60	60	57	60	61	54	39	38	15	21	16	30	60	61	51
	5:00 AM	5:30 AM	59	60	60	60	55	60	60	51	33	31	13	15	11	9	8	63	58
	5:30 AM	6:00 AM	61	61	59	61	57	61	61	51	21	19	12	14	9	8	14	64	63
	6:00 AM	6:30 AM	61	61	59	60	57	60	61	51	17	16	11	13	9	8	24	62	64
	6:30 AM	7:00 AM	61	61	57	61	58	60	61	53	15	15	11	12	8	8	50	66	64
	7:00 AM	7:30 AM	63	62	57	61	59	61	62	53	15	15	10	11	8	7	66	66	65
	7:30 AM	8:00 AM	63	61	57	61	59	61	62	53	15	15	11	11	8	7	66	66	65
	8:00 AM	8:30 AM	64	61	53	60	57	61	62	53	15	15	11	12	8	7	66	66	65
	8:30 AM	9:00 AM	64	60	51	60	58	61	62	53	15	15	10	11	8	7	65	65	64
9:00 AM	9:30 AM	63	60	52	60	57	60	61	53	16	15	11	12	8	20	65	65	64	
9:30 AM	10:00 AM	63	61	55	60	53	60	61	50	21	21	16	22	26	48	64	64	64	
EXPRESS LANE	4:30 AM	5:00 AM	60	60	61	60	61	61	61	59	59	59	59	59	59	59	58	61	56
	5:00 AM	5:30 AM	59	58	60	60	60	61	60	57	56	57	58	58	59	59	56	60	56
	5:30 AM	6:00 AM	60	60	61	60	61	62	60	57	56	58	58	58	58	59	56	60	56
	6:00 AM	6:30 AM	60	60	61	61	61	62	57	56	56	58	58	58	59	59	56	60	56
	6:30 AM	7:00 AM	60	61	61	61	62	62	38	56	54	58	58	58	59	59	56	60	56
	7:00 AM	7:30 AM	61	62	62	62	62	63	17	32	49	58	58	58	59	59	56	60	56
	7:30 AM	8:00 AM	61	62	62	62	63	63	14	17	18	41	56	58	58	59	56	60	56
	8:00 AM	8:30 AM	61	62	62	62	63	63	12	16	16	15	20	58	59	59	56	60	56
	8:30 AM	9:00 AM	61	61	62	61	62	62	15	17	17	15	17	56	59	59	57	60	56
9:00 AM	9:30 AM	60	60	61	61	62	62	24	28	33	40	48	59	59	60	58	61	56	
9:30 AM	10:00 AM	60	61	61	61	61	62	60	59	58	59	59	60	60	60	59	61	57	

Option 7: Minimal change in mainline operations

Summary

Scenario	Impacts
Existing Model	Extensive queuing at County Line Heavy delays throughout AM peak period.
Existing without Green River Road ramp meter	Green River Road travel time drops from 29 to 25 minutes Safety considerations – ramp dropping from 3 to 1 lane.
I-15 Option 1	Reduces impact to GP lanes of spillback out of EL's. Can result in slow moving EL traffic alongside fast moving GP traffic.
I-15 Option 2	Lessens potential for EL spillback into GP lane. Greater storage potential than Option 1. Results in a near-crawl speed at drop from 2 to 1 lane but overall speed comparable to Option 1.



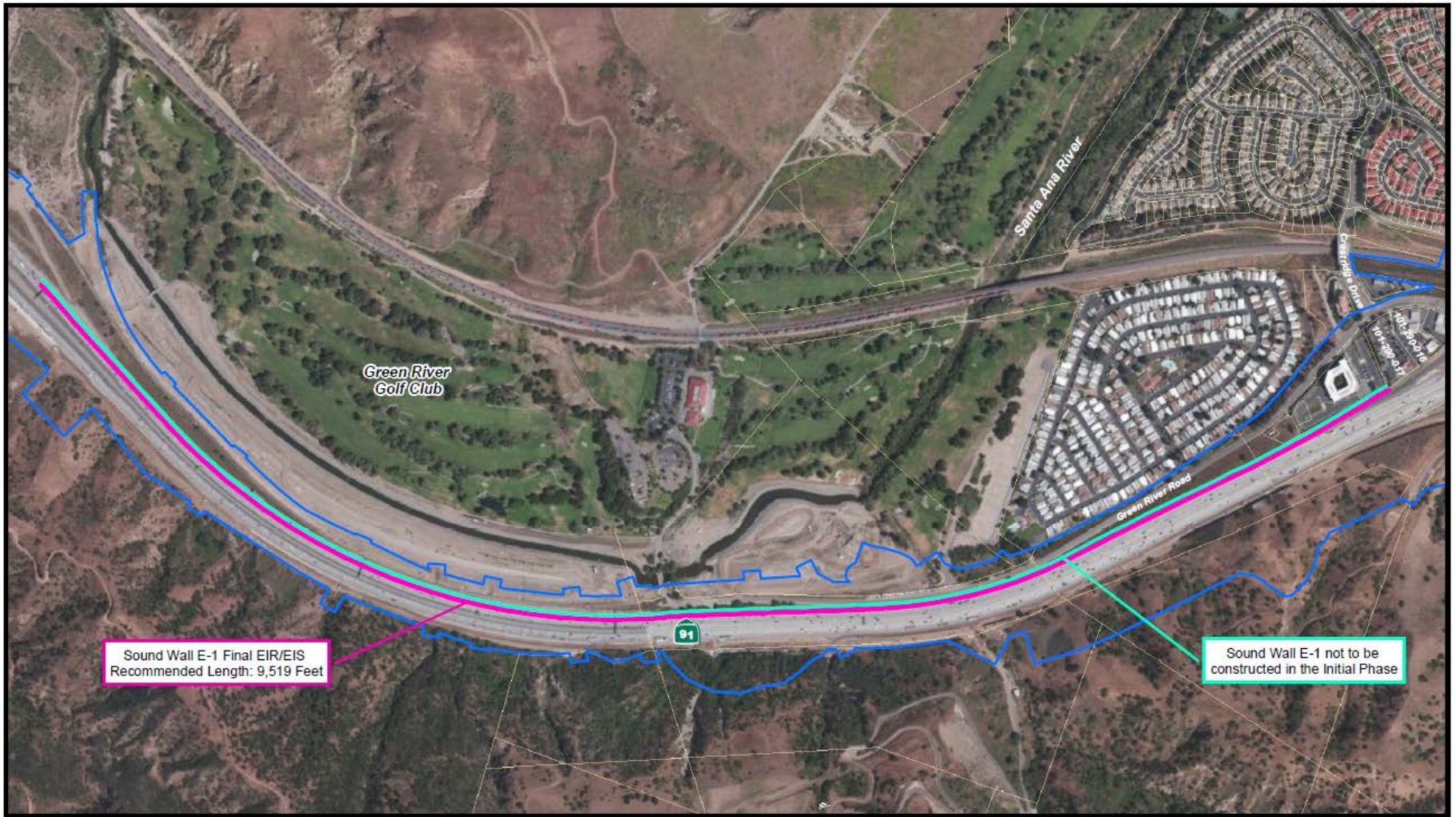
**91 WESTBOUND IMPROVEMENTS AT COUNTY
LINE:
IMPLEMENTATION**

Options Considered

- Option 1: Convert Express Lane Access Lane to Auxiliary Lane
- Option 2: Shift Express Lane Access East
- Option 3: Continuous Weave Lane
- Option 4: Convert Shoulder to Auxiliary Lane to Green River
- Option 5: Convert Shoulder to Auxiliary Lane to SR 71
- Option 6: Continuous Weave Lane & Convert Shoulder to Auxiliary Lane to Green River

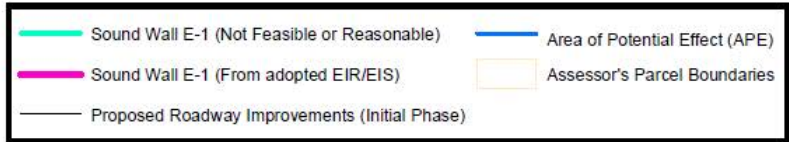
Evaluation of Options

- Cost
- Environmental
- Constructability
- Design Considerations
- Schedule



Sound Wall E-1 Final EIR/EIS
Recommended Length: 9,519 Feet

Sound Wall E-1 not to be
constructed in the Initial Phase



0 1,000 2,000 Feet

Source: GeoEye Aerial Imagery (2012); Cal-Atlas (2011);
Riverside County (2003); Parsons (2013)

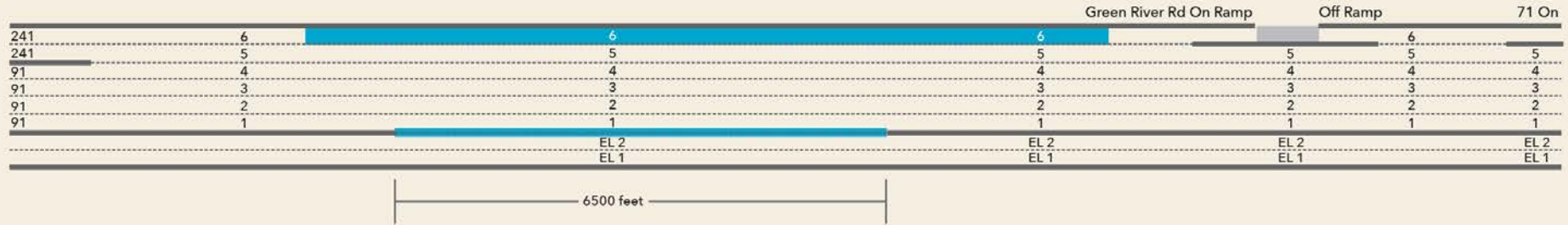
**SR-91 Corridor Improvement Project
Environmental Revalidation #3**

Exhibit 1: Sound Wall E-1

Option 1

Option 1

5+1 General Purpose, Remove Express Lanes Access Lane

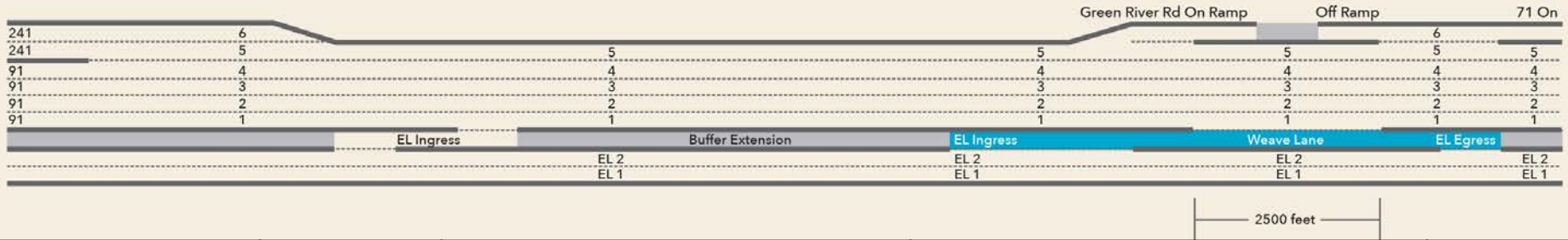


Cost	Environmental	Constructability	Design Considerations	Schedule
<ul style="list-style-type: none"> • \$2.5M (No Soundwall) • \$8.5M (Soundwall) 	<ul style="list-style-type: none"> • Noise • Air Quality 	<ul style="list-style-type: none"> • New Pricing Sign (Changeable Message) • Relocate Overhead Signs • Replace Guardrail and Asphalt Shoulder 	<ul style="list-style-type: none"> • No New Nonstandard Design Features 	<p>2 years</p>

Option 2

Option 2

Shift Express Lanes Access Lane

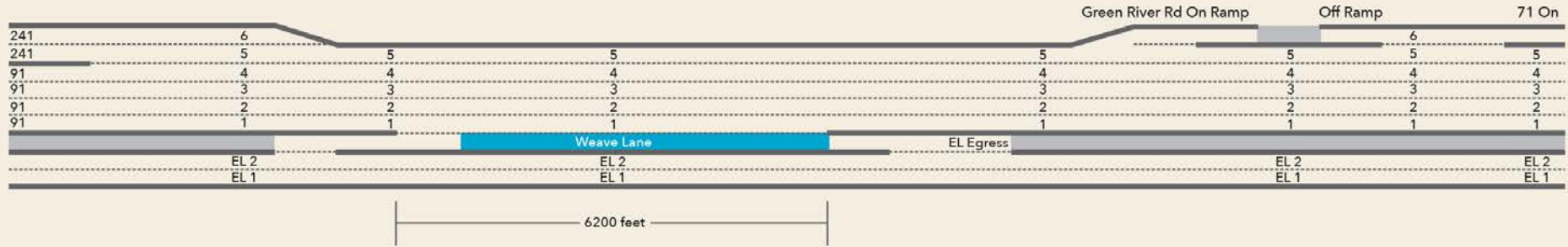


Cost	Environmental	Constructability	Design Considerations	Schedule
<ul style="list-style-type: none"> \$1M (No Soundwall) 	<ul style="list-style-type: none"> Noise Air Quality 	<ul style="list-style-type: none"> Convert Existing Changeable Message Sign <ul style="list-style-type: none"> Convert to Pricing Sign Relocate Overhead Signs 	<ul style="list-style-type: none"> New Nonstandard Features Requiring Approval: <ul style="list-style-type: none"> General Purpose Lanes #1, 2, & 3: 11'-Width 8'-Width Outside Shoulders Location of Weave Lane <ul style="list-style-type: none"> Horizontal Curve Green River Road Bridge 	1.5 years

Option 3

Option 3

Express Lanes Continuous Weave Lane

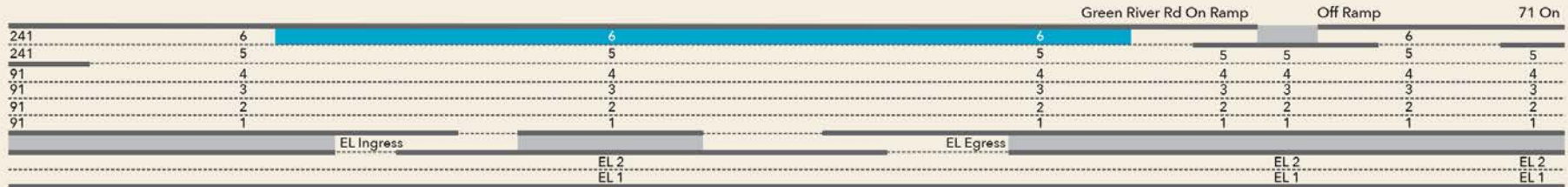


Cost	Environmental	Constructability	Design Considerations	Schedule
\$0.5M	<ul style="list-style-type: none"> Minimal Impacts 	<ul style="list-style-type: none"> Maintain Existing Overhead Signs 	<ul style="list-style-type: none"> No New Nonstandard Features 	9 months

Option 4

Option 4

5+1 General Purpose to Green River On Ramp

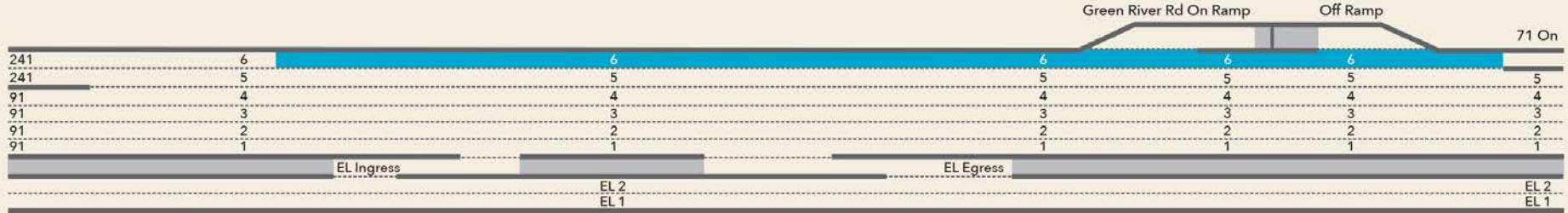


Cost	Environmental	Constructability	Design Considerations	Schedule
<ul style="list-style-type: none"> • \$4M (No Soundwall) • \$10M (Soundwall) 	<ul style="list-style-type: none"> • Noise • Air Quality 	<ul style="list-style-type: none"> • Significant Drainage Improvements • Replace Guardrail and Asphalt Shoulder • Overhead Sign Panel Shifts 	<ul style="list-style-type: none"> • New Nonstandard Features Requiring Approval: <ul style="list-style-type: none"> ◦ All Lanes 11'-Width, Impact to Trucks ◦ 2' Shoulders, Less Rain Capacity ◦ Stopping Sight Distance (48 mph) • Drainage Inlets in Outside Lane 	2 years

Option 5

Option 5

5+1 General Purpose to SR-71

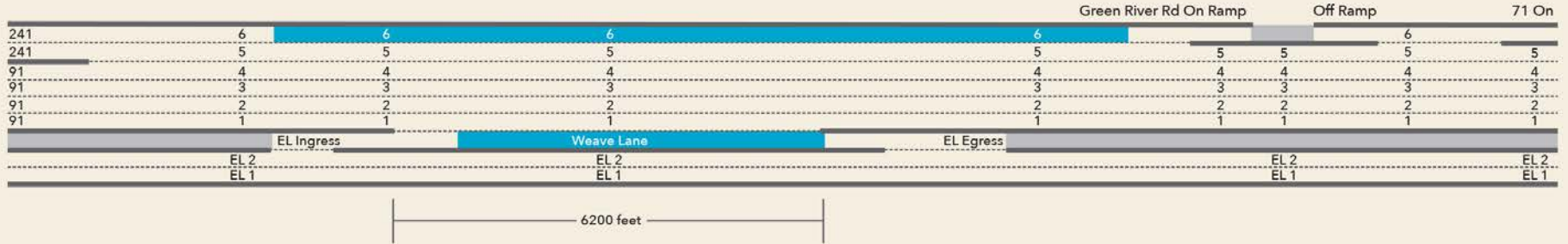


Cost	Environmental	Constructability	Design Considerations	Schedule
<ul style="list-style-type: none"> • \$5M (No Soundwall) • \$11M (Soundwall) 	<ul style="list-style-type: none"> • Noise • Air Quality 	<ul style="list-style-type: none"> • Significant Drainage Improvements • Replace Guardrail and Asphalt Shoulder • Overhead Sign Panel Shifts 	<ul style="list-style-type: none"> • New Nonstandard Features Requiring Approval: <ul style="list-style-type: none"> ◦ All Lanes 11'-Width, Impact to Trucks ◦ 2' Shoulders, Less Rain Capacity ◦ Stopping Sight Distance (48 mph) • Drainage Inlets in Outside Lane 	2 years

Option 6

Option 6

5+1 General Purpose Express Lanes to Green River On Ramp Combined with Continuous Weave Lane



Cost	Environmental	Constructability	Design Considerations	Schedule
<ul style="list-style-type: none"> • \$4.5M (No Soundwall) • \$10.5M (Soundwall) 	<ul style="list-style-type: none"> • Noise • Air Quality 	<ul style="list-style-type: none"> • Significant Drainage Improvements • Replace Guardrail and Asphalt Shoulder • Overhead Sign Panel Shifts 	<ul style="list-style-type: none"> • New Nonstandard Features Requiring Approval: <ul style="list-style-type: none"> ◦ All Lanes 11'-Width, Impact to Trucks ◦ 2' Shoulders, Less Rain Capacity ◦ Stopping Sight Distance (48 mph) • Drainage Inlets in Outside Lane 	2 years

Results Planned for Next Meeting

- Toll revenue impacts
 - 91 westbound, county line options 1, 3, 4, and 5
 - 15 northbound options 1 and 2
- Project implementation: cost, schedule, and issues
 - 15 northbound options 1 and 2
- Staff recommendation for 91 westbound action
- Staff recommendation for 15 northbound action